COSEWIC
Assessment and Update Status Report

on the

Western Screech-owl
Otus kennicottii

macfarlanei subspecies
kennicottii subspecies

in Canada

ENDANGERED – *macfarlanei* subspecies
SPECIAL CONCERN – *kennicottii* subspecies
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

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AU CANADA

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COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Western Screech-owl, *macfarlanei* subspecies

Scientific name
Otus kennicottii macfarlanei

Status
Endangered

Reason for designation
This subspecies has a very low population in Canada where it depends on mature riparian woodlands for nesting and roosting. These woodlands have been heavily impacted by agricultural and urban development over the last century. It also relies on cavities in old, large trees for nesting and roosting, trees which have become rare even within the woodlands that remain.

Occurrence
British Columbia

Status history
This species was placed in the Data Deficient category in April 1995. It was split according to subspecies in May 2002. The *Macfarlanei* subspecies was designated Endangered in May 2002. Last assessment based on an update status report.

Assessment Summary – May 2002

Common name
Western Screech-owl, *kennicottii* subspecies

Scientific name
Otus kennicottii kennicottii

Status
Special Concern

Reason for designation
This owl prefers open forest for foraging and requires cavities in old, large trees for nesting and roosting. Modern forestry practices have created large areas of dense young forests that have very few suitable nesting snags. Populations have apparently declined in southern Vancouver Island and the Lower Mainland concurrently with the recent arrival of the Barred Owl, which is likely a predator of this species.

Occurrence
British Columbia

Status history
This species was placed in the Data Deficient category in April 1995. It was split according to subspecies in May 2002. The *Kennicottii* subspecies was designated Special Concern in May 2002. Last assessment based on an update status report.

COSEWIC
Executive Summary

Western Screech-owl
Otus kennicottii

Species information

The Western Screech-owl, *Otus kennicottii*, is a small, grey-brown owl with streaked plumage and 'ear tufts'. Its appearance is very similar to the Eastern Screech-owl, which was considered conspecific with the Western Screech-owl until 1983. As the ranges of the two species do not usually overlap in Canada misidentification is unlikely. There is confusion over the number of subspecies of Western Screech-owl that occur in North America. This report, however, follows the most current source, which considers that there are two subspecies in Canada, *Otus kennicottii kennicottii* and *Otus kennicottii macfarlanei*.

Distribution

The Western Screech-owl is found in western North America from southern Alaska to central Mexico. In Canada, the species occurs only in British Columbia (BC) in two regions: along the coast of BC including Vancouver Island, but excluding the Queen Charlotte Islands (*O. k. kennicottii*), and in the southern interior part of the province (*O. k. macfarlanei*), with most of the interior birds being found in the Okanagan Valley.

Habitat

In Canada the owl is found at lower elevations generally in wooded environments that are often in riparian (creek-side) zones, although it is does not seem to be tightly linked to a particular type of woodland. It can also be found in treed urban and suburban environments, and at the edge of forested habitats close to open wetlands or fields. Along the coast it seems to be mostly found in either coniferous or mixed (deciduous or coniferous) forests, whereas interior birds seem to be found more frequently in deciduous or mixed forests. During the daytime it roosts in either coniferous or deciduous trees.

Biology

The Western Screech-owl is a nocturnal, non-migratory species that is territorial year-round. It has been known to live up to 11 years in the wild, but its average life-span is not known. It nests in natural cavities in trees generally made by large

woodpeckers, or in nest boxes. They seem to be opportunistic in their choice of prey. Their diet includes various species of mammals, fish, birds, insects and other invertebrates. The owl is preyed upon by several predators including large owls such as the Barred Owl (*Strix varia*). The Barred Owl has only become common in western BC in the last decade or two, thus it is a new predator for the Western Screech-owl.

Population sizes and trends

The population size and trends of the Western Screech-owl in Canada are difficult to estimate because there are few published sources of information on this subject. Given that the coastal subspecies appears to be relatively common on most of Vancouver Island and that it also occurs along a large stretch of the mainland coast, the upper estimate for this population might be as high as 10,000 birds. However, a lower estimate of 3,000 birds may be more realistic because populations in the southern populated parts of the coast appear to be declining, and it is not known if the rest of the coastal subspecies is declining as well.

A rough estimate for the very small interior population is 50 to 200 birds. Most sightings, and all breeding records, come from the Okanagan Valley, but individuals are also found rarely elsewhere in the southern interior. The subspecies seems to have always been rather uncommon and its population is now very small.

Limiting factors and threats

Along the south coast of BC, declines in Western Screech-owl populations have occurred at the same time as strong increases in the Barred Owl population. The evidence for a direct link between these two phenomena is mostly anecdotal, but it is repeated by numerous sources. Serious habitat loss is occurring in the southern interior of BC where the valley bottomlands preferred by screech-owls are more likely to be developed than other habitats. Also, Western Screech-owls require trees that are large enough to hold a nest cavity within which they can breed; thus some forestry practices in urban and wilderness situations may negatively impact this species.

Special significance of the species

The Western Screech-owl has been considered an indicator species for healthy riparian ecosystems throughout most of its range. Its dependence on older trees for roosting and nesting cavities and position near the top of the food chain make it an ideal choice for an umbrella species in multispecies conservation plans.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.
** Formerly described as “Not In Any Category”, or “No Designation Required.”
*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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Update
COSEWIC Status Report

on the

Western Screech-owl
Otus kennicotti

Macfarlanei subspecies
Kennicottii subspecies

in Canada

2002

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SPECIES INFORMATION

Name and classification

The Western Screech-owl (*Otus kennicottii*) was formerly considered to be conspecific with the Eastern Screech-Owl (*Otus asio*) (AOU 1957). In 1983, the Western Screech-owl was recognized as a separate species (AOU 1983). It has been referred to as Kennicott's Screech-Owl, although this is sometimes in reference to the subspecies *Otus kennicottii kennicottii* only. The French name for the species is Petit-duc des montagnes.

The taxonomy of subspecies of the Western Screech-owl remains complex and uncertain. The American Ornithologists' Union (AOU 1998) recognizes two broad groups: *O. kennicotti* (Western Screech-owl) and *O. vinaceus* (Vinaceous Screech-Owl), which are now considered conspecific because they intergrade and because they have similar vocalizations. Those examining the subspecies taxonomy have divided the Western Screech-owl into numerous and differing numbers of subspecies: Cannings and Angell (2001) nine subspecies; Hekstra (1982) 18 subspecies; Marshall (1967) eight subspecies. Miller and Miller (1951) recognised eight races in the southwestern United States portion of their range, where there appears to be the greatest amount of variation within the species.

Within Canada, there are either two or three subspecies, depending on which authority is used. The British Columbia Conservation Data Centre (BCCDC), until recently followed Hekstra (1982), who recognized three subspecies: *Otus kennicottii kennicottii* (found in most of coastal BC), *O. k. saturatus* (primarily southeastern Vancouver Island), and *O. k. macfarlanei* (southern interior of BC). On the other hand, Cannings and Angell (2001), Godfrey (1986), and now the BCCDC recognize two subspecies only, *O. k. kennicottii* and *O. k. macfarlanei* , with *O. k. saturatus* subsumed under *O. k. kennicottii* . Similarly, Marshall (1967) considered *O. k. kennicottii* to occur on the coast and O. k. bendirei (into which he merged *O. k. macfarlanei*) as occurring in the Okanagan.

In this status report two subspecies—*Otus kennicottii kennicottii* and *Otus kennicottii macfarlanei*—are considered to occur in Canada, following Cannings and Angell (2001) as the most current source.

Nationally significant populations

The two subspecies of Western Screech-owl, *O. k. kennicottii* and *O. k. macfarlanei* are considered separately throughout this report. This is because the two populations are uniformly recognized to be two different subspecies, the ranges of the two subspecies are not contiguous with one another and they occur in different ecological zones.

Description

The Western Screech-owl is a small streaked owl, with 'ear tufts' and yellow eyes. The length of the adults varies between 19 and 25.5 cm., while the weight ranges between 120 and 305 g (Cannings and Angell 2001). Females are generally larger and heavier than males (Earhart and Johnson 1970, Johnson 1997, Cannings and Angell 2001). Similarly, the more northern subspecies are often larger and heavier than the southern subspecies (Miller and Miller 1951, Johnsgard 1988). Females have the same plumage as the males. The overall coloration of the species is grey-brown, with fine dark vermiculations on the breast overtop an off-white background, and a streaky mottled effect throughout most of the remainder of the plumage. A small percentage of *O. k. kennicottii* birds are reddish-brown (Johnsgard 1988, Cannings and Angell 2001). *O. k. macfarlanei* are generally paler than *O.k. kennicottii* (Bent 1938, Godfrey 1986).

The Eastern Screech-owl looks almost identical to the Western Screech-owl, but in Canada the ranges do not overlap, so confusion is unlikely. Also, one can easily distinguish the species by their vocalizations. The most typical territorial call of the Western Screech-owl is a series of quick hoots on one pitch that gradually speed up throughout the call. The corresponding call of the Eastern Screech-Owl is a descending whinny. Both species also give long trill calls; the Western Screech-owl's is a double trill, while the Eastern gives a long single trill. The vocalizations of neither species sound like screeches or shrieks despite the common name.

DISTRIBUTION

Global range

The Western Screech-owl occurs in the western portion of the North American continent in Canada, the United States of America, and Mexico (Figure 1). It is found in appropriate habitat in part or all of the following American states: Alaska, Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona, New Mexico and Texas. Within Mexico, it is found in Baja California and Sonora, as well as southward through the centre of Mexico from Chihuahua to Mexico City.

Canadian range

Within Canada, the Western Screech-owl is primarily found in BC, although there are records from Alberta and Saskatchewan (Figure 2). *O. k. kennicottii* occurs on the BC coastal mainland west of the coastal ranges, and on Vancouver Island, while *O. k. macfarlanei* occurs mainly in the southern interior. The species is not found on the Queen Charlotte Islands.

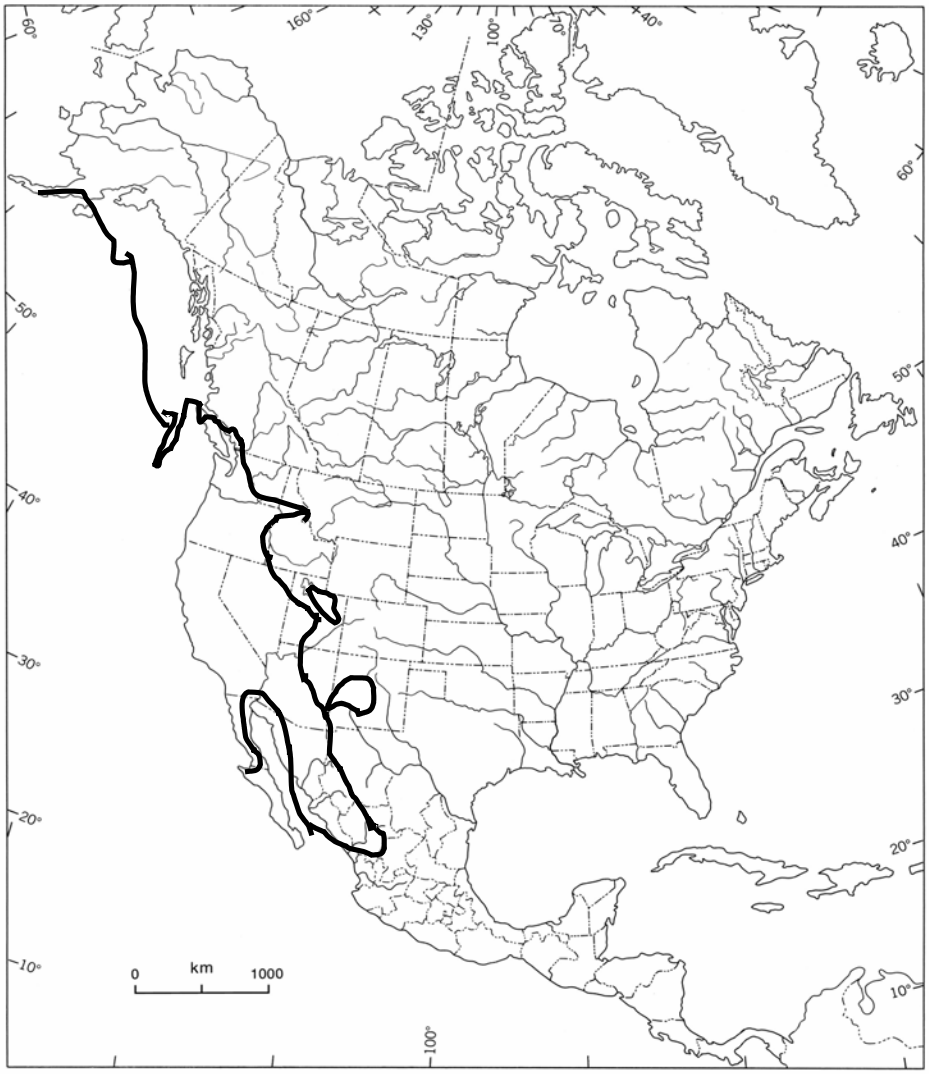

Figure 1. North American range of western screech-owl (*Otus kennicottii*) (to west of line; excluding Queen Charlotte Islands). Primarily from Cannings and Angell in press.

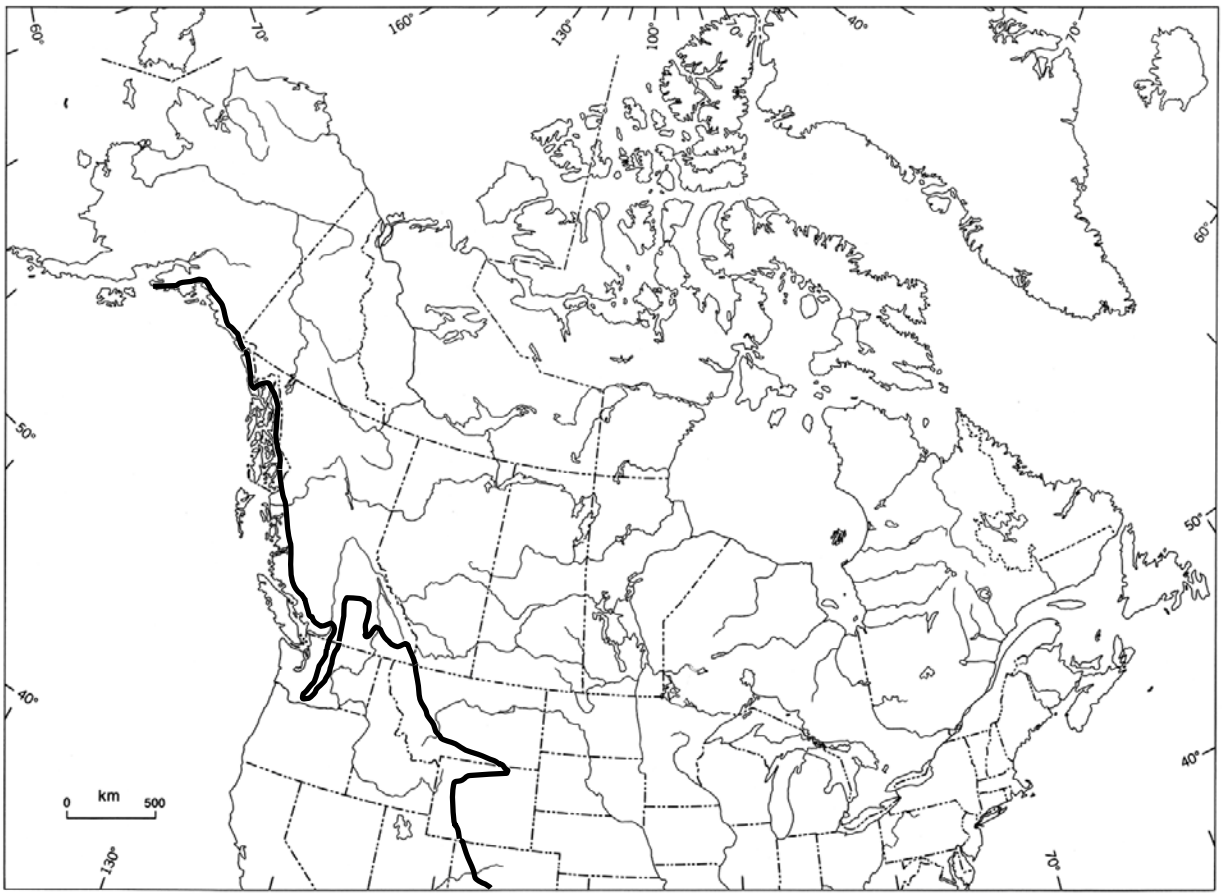

Figure 2. Canadian range of western screech-owl (*Otus kennicottii*) (to west of line; excluding Queen Charlotte Islands). In part from Cannings and Angell *in press.*

Coastal Subspecies – *Otus kennicottii kennicottii*

O. k. kennicotti occurs at lower elevations throughout much of Vancouver Island, and in coastal forests west of the coastal ranges, from the U.S. border northward to and continuing into Alaska (Campbell et al. 1990, Guiguet 1949). It is thought to occur throughout the northern BC coast but records there are very sparse, perhaps in part because small numbers of people live there. In this part of its range it is occasionally recorded in the Kitimat Valley - Terrace area (Campbell *et al.* 1990, Hazelwood, pers. comm., 2001, Horwood, pers. comm., 2001, Macleod, pers. comm., 2001), but does not occur 100 kilometres further up the Skeena River in New Hazelton (Doyle, pers. comm., 2001). The extent of occurrence (EO) for *O. k. kennicottii* is roughly 200,000 km^2, and the area of occupancy (AO) is about 50,000 km^2.

Interior Subspecies – *Otus kennicottii macfarlanei*

In Canada, *O. k. macfarlanei* occurs in the southern interior (between the coastal ranges and the Rocky Mountains) of BC; all breeding records are from the Okanagan

Valley (Campbell et al. 1990). Godfrey (1986) incorrectly showed this subspecies occurring north to Prince George and Vanderhoof (and Johnsgard (1988) mistakenly followed suit), but it does not occur this far north (Kinsey pers. comm. 2001, Campbell et al. 1990). The northernmost valid records are from Adams Lake and Anstey Arm of Shuswap Lake (Campbell et al. 1990). The northernmost records from the BCCDC (2001), and from a survey of *O. k. macfarlanei* (covering an area as far north as Kamloops, Cannings 1997) are further to the south still, in the Kelowna area, although these sources would not be expected to be all-inclusive.

The eastern boundary of *O. k. macfarlanei* is also imprecisely known, in part because the species is very rare in the eastern portion of its range. The species does not occur in the Revelstoke area (Woods, pers. comm., 2001), but the easternmost records for the species in BC are from the Cranbrook and Wardner areas (Campbell et al. 1990). These two records are both old; from 1912 and 1941 respectively. There are a few recent records from the Castlegar and Creston areas (Clow, pers. comm. 2001, Beaucher, pers. comm. 2001).

There are only a handful of records from Alberta and Saskatchewan and the species presumably does not breed in those provinces. In Alberta, the species is listed as a vagrant (Semenchuk 1992). There are two records from Waterton Lakes National Park in the southwestern corner of Alberta as well as single records from Cardston and Lethbridge (Sharp 1973, Pinel et al. 1991, Smith, pers. comm., 2001). In Saskatchewan, the species is listed as hypothetical (Smith 1996). The most certain record of the species in Saskatchewan is of birds calling in the springs of 1992 and 1994 in the Cypress Hills in southwestern Saskatchewan (Smith 1996).

The extent of occurrence (EO) for *O. k. macfarlanei* is roughly 22,000 km^2, and the area of occupancy (AO) is about 100 km^2.

HABITAT

Habitat requirements

The habitats in which Western Screech-owls are found are quite varied: forests, semi-open woodlands, and scrubland, as well as arroyos, mature mesquite, cactus deserts, and treed suburban and urban areas (Bent 1938, Johnsgard 1988, del Hoyo *et al.* 1996, Hardy *et al.* 1999, Cannings and Angell 2001). It is often found in riparian zones.

Within Canada and the northern US states, the owl is generally found in lower elevation forested or treed environments, but the forest type and proportion of coniferous to deciduous trees vary depending on location. It is not found at higher altitudes; the upper elevation at which *O. k. macfarlanei* is found has been variously estimated at: 600 m altitude above sea level (asl) (BC interior, Campbell *et al.* 1990), 1,220 m asl (US interior, Bendire in Bent 1938), and 1,555 m asl (southwestern Idaho, Doremus, pers. comm., 2001). The coastal subspecies *O. k. kennicottii* has been

described as occurring between the January isotherms of 2°C and –7°C, or up to 915 m in Oregon and near sea level in southern Alaska (Hekstra 1982).

Coastal Subspecies – *Otus kennicottii kennicottii*

The coastal subspecies, *Otus k. kennicottii* seems to be found in a relatively wide variety of forest types. Early reports of the species in southwestern BC and northwestern Washington describe the species as occurring in a mixture of wooded habitats often dominated by deciduous trees and sometimes in open woodlands or near agricultural areas (Bowles 1906, Bowles 1917, Munro 1925). Campbell *et al.* (1990) state that it prefers mixed deciduous/coniferous forests, often along lakeshores and streams, but that it is found in all woodland habitats.

In 2000, habitats and roost locations of ten Western Screech-owl sites outside of Victoria, BC were examined (Darling and Hobbs pers. comm., 2001). Owls were found in mixed coniferous-deciduous forests, where the eight most common species in descending order of abundance (based on stem number) were: Douglas-fir (*Pseudotsuga menziesii*), Arbutus (*Arbutus menziesii*), Western Redcedar (*Thuja plicata*), Grand Fir (*Abies grandis*), Red Alder (*Alnus rubra*), Broadleaf Maple (*Acer macrophyllum*), Garry Oak (*Quercus garryana)* and Western Hemlock (*Tsuga heterophylla*). Canopy cover was relatively open and dominated by the conifers. Sites were an average of 69 m, and up to 300 m, from a stream or marsh; many sites were also close to openings such as marshes, fields, or houses. Since some sites were previously known owl locations, it could be that sites were biased towards man-made openings as owls in these areas would be more likely to be found by casual observers. Of six roost sites, four were in Western Redcedar. Roost heights were variable, but were on average 25 m above the ground. In the areas around roost sites, there was a small amount of shrub level cover, but what was there was composed primarily of Sword Fern (*Polystichum munitum*), Oregon-grape (*Mahonia* spp.), Salal (*Gaultheria shallon*), and Ocean Spray (*Holodiscus discolor*).

On southern Vancouver Island and the Gulf Islands, Hobbs (pers. comm. 2001), has found the owl in spring and summer months in a variety of habitats including those described as: mixed riparian woods, mature forest, 50 to 60 year old open Douglas-fir forest, dense young Douglas-fir forests and a mix of locations that are woodlands bordering marshes, ponds, other wet areas or fields. He has seen Western Screech-owls roosting in natural cavities in deciduous and Douglas-fir trees. Roosting birds were often seen high up in the crown of the tree. Cooper (pers. comm. 2002) feels that most screech-owls on Vancouver Island and the Lower Mainland occur in mixed riparian woods, woodlands adjacent to fields, and open coniferous forests. He has noted them in open Douglas-fir/Arbutus forests on James Island, just east of Sidney.

In the mid-1990s, Robertson *et al.* (2000) recorded Western Screech-owl roost sites in the Lower Mainland and in locations northward up the nearby mainland coast as part of larger inventory studies. The Lower Mainland encompasses an area from approximately North Vancouver south to White Rock and east to Chilliwack. Owls were

often found in mixed deciduous-coniferous woods greater than 50 years old, but numerous birds were also found in a 25 to 30 year-old Douglas-fir plantation. Roosting birds, usually perched close against the tree trunk, were always in conifers, mostly Western Hemlock and Western Redcedar. The authors felt that dense conifer roosts were important for the survival of the species. Bowles (1917) also notes that during the daytime, this species is usually found in the 'dark foliage of some young fir'.

It seems likely that *O. k. kennicottii* prefers deciduous or mixed forests in the south where the species is best known, but in a large part of its range it occurs primarily in coniferous forests (though it may well key in on deciduous trees for roosting and nesting). Three recent studies described below show that Western Screech-owls occur in good numbers in coniferous forests (Setterington 1998, Holroyd *et al.* 2000, Mico and Van Enter 2000). Hazelwood (pers. comm. 2001) says that screech-owls are generally reported from mature hemlock forests in Terrace, BC.

In a Clayoquot Sound in western Vancouver Island, Western Screech-owls were found in all three Coastal Western Hemlock (CWH) biogeoclimatic zones that they sampled (CWHvh1, CWHvm1, CWHvm2[1]) (Holroyd et al. 2000). In a Campbell River watershed study, in eastern Vancouver Island, owls were also recorded in second-growth Douglas-fir and Western Hemlock forests within the Coastal Western Hemlock zone (CWHxm1, CWHxm2, CWHvm1[1]), although precise habitat associations could not be made (Mico and Van Enter 2000). The five study areas were dominated by second growth Douglas-fir and Western Hemlock, with smaller amounts of Western Redcedar. At one site, Western Hemlock and Amabilis Fir (*Abies amabilis*) dominated.

A three-year study of owl abundance in the Nimpkish Valley of northern Vancouver Island indicated that Western Screech-owls were common in the coastal coniferous forests occurring there (Setterington 1998). Screech-owls were found in forest dominated by hemlock, Douglas-fir and Western Redcedar. The deciduous component of the parts of the forest where screech-owls were found was only about 3.7%, but this was still a statistically higher portion than in random plots where the deciduous component was about 1%. Based on forest cover maps, and not on on-the-ground vegetation surveys, the owls were found in forests with the following average characteristics: basal area of 44 m^2/ha, stand age of 128 years, height of 25 m and 50% crown closure. The basal area was lower, forest age younger and crown closure less than in random plots.

Nests were not looked for in any of these three studies, thus it is not known what species of trees were being used as nest trees in these parts of the province. See Biology, Reproduction section for more information on nest trees.

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[1]CWHvh1 = southern hypermaritime Coastal Western Hemlock (found between 0-200m elevation), CWHvm1 = submontane very wet maritime Coastal Western Hemlock (0-650 m), CWHvm2 = montane very wet maritime Coastal Western Hemlock (650-1000m in southern BC) CWHxm = very dry montane Coastal Western Hemlock (0-700 m). *From A Field Guide for Site Identification and Interpretation for Vancouver Forest Region, Land Management Handbook #28*, Ministry of Forests.

Three other bird species at risk that occur in parts of BC in broadly similar habitat to the coastal subspecies of Western Screech-owl are the Queen Charlotte Goshawk (*Accipiter gentilis laingi*), Marbled Murrelet (*Brachyramphus marmoratum*) and the Spotted Owl (*Strix occidentalis*), though these three species often occur at significantly higher elevations than does the screech-owl.

Interior Subspecies – *Otus kennicottii macfarlanei*

In BC and Idaho, the interior subspecies *O. k. macfarlanei* is usually described as inhabiting deciduous valley bottoms and low elevation riparian areas, and to a lesser degree wooded urban areas (Cannings *et al.* 1987, Hayward and Garton 1988, Campbell *et al.* 1990, Cannings 1997, Belthoff, pers. comm., 2001, S. Clow, pers. comm., 2001). Areas with Black Cottonwood (*Populus trichocarpa*) trees are often favoured (Cannings 1997, Belthoff, pers. comm., 2001).

At nine Western Screech-owl sites studied by Cannings (1997), breeding habitats were either of deciduous and mixed deciduous-coniferous forest types. Mature Black Cottonwoods were often present. Elevations of sites with owls were between 360 and 840 m, but were mostly below 600 m. Owl sites were either within riparian zones or up to 200 m away from the zone (all sites examined with or without owls were up to 300 m away). Birds were found roosting in coniferous and deciduous trees. In the Okanagan, screech-owls have been detected during the breeding period in slightly wetter habitats than those described above, that is, riparian, but with characteristics typical of poorly drained sites, such as standing water and vegetation typical of marsh habitats (Hobbs *in prep.*).

In the River of No Return Wilderness, Idaho, Hayward and Garton (1988) examined the habitat differences of five owl species. Western Screech-owls were much more likely to be found in places where deciduous tree cover was relatively high and were generally found in deciduous-dominated bottoms at the lowest elevations within the study areas (1175 m), but not in conifer forests of Douglas-fir or Lodgepole Pine (*Pinus contorta*) which were more common forest types. The same authors (Hayward and Garton 1984) examined the winter and spring roost sites of two Western Screech-owls in the same area. Roosting birds were found in riparian mixed deciduous and coniferous habitat within the area. They used only conifer roost sites in the winter, but after the leaves had appeared they roosted about half the time in deciduous trees but usually positioned themselves next to the bole of the roost tree. Roosts were also in areas of relatively greater tree density, suggesting to the authors that sites were chosen to provide both thermal and hiding cover.

Trends in habitat

Concerns over Western Screech-owl habitat focus on the regions of southern Vancouver Island and the Lower Mainland. In the former two regions, urban development continues, and inevitably leads to a decline in the amount of low elevation forested habitat (Fraser et al. 1999, Robertson *et al*. 2000).

In the interior of BC, the amount of wooded riparian habitat is decreasing significantly. Numerous sources have commented that development of riparian zones for housing, agriculture and forestry can and have affected the amount of available riparian woodlands in BC and Idaho (Cannings *et al*. 1987, del Hoyo 1996, Cannings *et al*. 1998, Belthoff pers. comm., 2001, S. Clow pers. comm., 2001). Recent analyses have indicated that about 87% of the water birch and 32% of the cottonwood habitats favoured by this species has disappeared from the Okanagan Valley over the past century (Dyer, pers. comm.).

Cannings *et al*. (1998) showed that much of the land in the south Okanagan that was riparian (or grassland) in 1940 had been converted to agricultural or urban habitats by 1987. They estimated that only 48% of the area that was riparian in 1940 remained in 1987, while the remainder was altered. Most of this land was converted to moist pasture or agricultural fields (Cannings *et al*. 1998). Areas of land under urban uses are also increasing.

Protection/ownership

In the Lower Mainland, southern Vancouver Island and the heart of the Okanagan Valley portions of the Western Screech-owl range, most of the land is privately owned. A small minority of the land where the bird has occurred is in protected local or regional parks, such as Pacific Spirit Regional Park near Vancouver, Campbell Valley Regional Park in Langley, and Woodhaven Nature Conservancy in Kelowna. Some habitat is protected in coastal provincial parks such as Goldstream and Helliwell and in Pacific Rim National Park. A new national park proposed for the Gulf Islands would protect a significant amount of habitat.

About 1,721 ha (11%) of potential Western Screech-owl habitat in the southern Okanagan is in conservation lands (MWLAP 2001). In the same study, the remainder of *O. k. macfarlanei* potential habitat was found to be 31% crown land, 32% Indian reserve, and 26% privately owned. These figures do not include newly created parks in the south Okanagan (e.g. White Lake Grasslands Provincial Park and South Okanagan Grasslands Provincial Park) that have significant amounts of suitable habitat.

There is no significant change expected in the ownership of habitats where the Western Screech-owl occurs.

BIOLOGY

General

Apart from some aspects of its diet and its environmental needs, the Western Screech-owl is not a well-studied species. It is a nocturnal species, foraging (Hayward and Garton 1988) and generally calling only at night. It is essentially non-migratory in British Columbia (Campbell et al. 1990). Pairs are territorial throughout the year and can

be heard calling at all times of the year to varying degrees. See Cannings and Angell (2001) for more information on topics such as social behaviour and vocalizations.

Reproduction

The Western Screech-owl is probably monogamous, with pair formation beginning in January or February (Cannings and Angell 2001). Most birds are thought to begin breeding at a year of age, but average age of breeding is not known (Cannings and Angell 2001). Eggs in BC are recorded as being laid between 17 March and 31 May, with about half recorded in the middle half of April, while young were found between 19 April and 21 August, with half recorded in May (Campbell *et al*. 1990). Out of 50 fledgling birds in Idaho, the average date for leaving the nest was May 18 (Ellsworth and Belthoff 1997). The species is single-brooded, and lays on average 3.4 eggs in the coastal and Great Basin regions of North America (Murray 1976), but can lay between two and seven eggs (Cannings and Angell 2001).

Nests are in natural tree cavities or nest boxes where provided, with no nesting material used. Of the 62 nests recorded by Campbell *et al.* (1990) in BC, over three-quarters were in nest boxes, but of the remaining nests, 26% were in natural cavities within Black Cottonwood, Red Alder, Douglas-fir, Western Redcedar and Western Hemlock trees, and 13% were in cavities excavated by Pileated Woodpeckers (*Dryocopus pileatus*) or Northern Flickers (*Colaptes auratus*). All nests in natural cavities were in trees with diameter at breast height (dbh) of greater than 25 cm. Of two nests found near Victoria, one was in a nest-box on a 71 cm dbh Douglas-fir and another in an 35 cm dbh unidentifiable deciduous tree (probably Red Alder, Hobbs pers. comm. 2001). In the second tree, the entrance cavity was about 15 m up from ground, about 11 cm in diameter and the cavity was 58 cm deep from top to bottom. Two nests in the Okanagan region were in cottonwood trees (Cannings *et al.* 1987) and Bent (1938) also mentions use of cottonwoods by both *O. k. macfarlanei* and *O. k. kennicottii*. In northwestern Washington, Bowles (1906) usually found nests in a natural cavity of an oak or fir stub, but also found at least one nest in a hole excavated by flickers.

Survival

The longest-lived bird on record in the wild was a California bird that was almost 13 years of age (Clapp *et al.* 1983), while another in Idaho lived to 11 years (Doremus *in* Cannings and Angell 2001). Average life span is likely on average much shorter. Breeding females and males in Idaho had an average life span of 1.73 and 1.83 years respectively (Doremus in Cannings and Angell 2001).

Many Western Screech-owls die in collisions with motorized vehicles (Hawbecker 1938, Dorst, pers. comm., 2001, Hobbs, pers. com. 2001, Holmes, pers. comm., 2001). Campbell et al. (1990) cite several road-kills in British Columbia, as well as mortalities along train tracks. Dyer (pers. comm. 2002) reports that four screech-owls were killed along roads in the south Okanagan in 2001—a significant number considering the low total population there.

Movements/dispersal

Ellsworth and Belthoff (1997) studied the dispersal of young screech-owls in Idaho. They found that on average birds dispersed 10.6 km (females 14.7 and males 5.1) to presumed over-wintering sites. The furthest a bird was recorded as dispersing was 36 km.

Nutrition

Western Screech-owls have an extremely varied diet. They have been recorded as eating small mammals, birds, fish, reptiles, and a wide variety of insects and other invertebrates (Ross 1969, Earhart and Johnson 1970, Brown *et al*. 1986, Johnsgard 1988, Marti *et al*. 1993). In some locations the diet appears to be composed of a mix of taxa while other individuals, depending on the season, appear to specialize on the food that is most readily available.

In coastal regions of BC, the species has been recorded as eating fish, birds, beetles, lepidopterans, and other insects (Munro 1929, Guiguet 1949, Ryder 1973 (in Cannings and Angell 2001), Hazelwood 1994), while in the interior one bird had eaten crickets and a caterpillar (Cannings 1987), and another had eaten a Northern Flicker (*Colaptes auratus*, Munro 1929). Western Screech-owls in BC undoubtedly eat small mammals, as their diet in one study in Idaho was almost completely composed of mammals (Marks and Marks 1981).

Interspecific interactions (Predation)

Great-horned Owls (*Bubo virginianus*), Spotted Owls, Barred Owls (*Strix varia*), and Raccoons (*Procyon lotor*) all prey on Western Screech-owls (Johnsgard 1988, Cannings and Angell 2001). As recently as in Johnsgard (1988) Barred Owls were not reported as having preyed upon Western Screech-owls, but there is an increasing body of mostly anecdotal evidence that convincingly shows that Barred Owl predation may be frequent. Ryder (pers. comm. via Clulow 2001) saw a Barred Owl eating a Western Screech-owl in the Langley area. Birders have also seen Barred Owls either fly in silently when a Western Screech-owl tape is played (Levesque 2000, Hobbs, pers. comm., 2001, Clulow, pers. comm. 2001, Darling pers. comm. 2002) or to fly directly at a Western Screech-owl or tape machine playing a screech-owl call (Levesque 2000, Acker, pers. comm., 2001, Darling pers. comm. 2002). Barred owls have only recently become established in BC, and are a new predator for the Western Screech-owl in many parts of its range. The Barred Owl arrived in the northeastern part of BC about 50 years ago through natural range expansion, and reached the coast in the mid-1960s (Campbell *et al.* 1990). Only in the 1980s did it become common in southwestern BC (Dunbar *et al.* 1991). For more information on Barred Owl-Western Screech Owl interactions see Limiting Factors and Threats.

Adaptability

Western Screech-owls are adaptable in that they will readily take to using nest-boxes (Campbell et al. 1990, Doremus pers. comm., 2001). Also, it seems likely that the species is very adaptable to different food sources as they appear to eat almost any live prey that is of appropriate size. On the other hand, they are presumably somewhat restricted in their habitat use in that (where nest boxes are not provided) they need trees that are large enough to accommodate their nest cavities.

POPULATION SIZES AND TRENDS

Population estimates are almost non-existent for Western Screech-owls, and those that do exist are educated guesses. Being a small nocturnal species, the screech-owl is not often seen nor is it particularly easily surveyed. Descriptions of the species' abundance vary. Beginning with the earliest description, Bowles (1906 and 1917 describes the species first as 'tolerably common' in northwestern Washington and then 'by no means common.' Based on discussions with ornithologists in the 1970s, BC screech owls were described as being of low-medium abundance and having stable populations (Fyfe 1976). More recent discussions of Canadian Western Screech-owl abundance can be found in the previous COSEWIC report (Kirk 1994), as well as Kirk *et al.* (1995), Campbell et al. (1990) and Kirk and Hyslop (1998). The only Canadian population estimate for the species as a whole given in these sources is a 'best guess' of 1,000-2,000 pairs in Kirk *et al.* (1995). Cannings (1997) estimated that there were fewer than 20 *O. k. macfarlanei* in the Okanagan Valley in 1996 and Fraser et al. (1999) estimated that there were fewer than 3,000 screech-owls on southern Vancouver Island and the Gulf Islands (=*O. k. "saturatus*").

Breeding Bird Surveys (BBS) and Christmas Bird Counts (CBC) are potential sources of information on population trends, but are not that useful for Western Screech-owl. The BBS, a daytime survey carried out by volunteers across North America has very limited value for assessing nocturnal species populations. Western Screech-owls were recorded on nine routes between 1966 and 1977, and on another eight between 1978 and 1983, but the increase shown from this data is statistically insignificant because the number of records is too small (Kirk 1994). Downes *et al.* (2001) continue to indicate that there is not enough Canadian BBS data for statistical analysis for this species. CBCs are more likely to show trends as some participants conduct nocturnal owl counts within their area. Kirk *et al.* (1995) indicate that there was a significant positive trend in Western Screech-owl numbers continent-wide between 1959 and 1988, but Kirk (1994) hypothesizes that this may be due to increased numbers of people owling rather than a real population increase. Also, the CBC count compiler for White Rock, BC indicates how the presence of a single keen owl observer on that count made a significant difference to the number of owls found (Mackenzie pers. comm., 2001). Examination of two counts in southwestern BC (Ladner and Vancouver) show that Canadian CBC numbers in BC are likely too small for analysis (BirdSource).

Two other sources of information may help to describe populations in the future. The new Bird Studies Canada British Columbia Nocturnal Owl Survey which began in 2000 may become important in elucidating owl trends, but cannot do so yet due to its newness. Secondly, those undertaking Spotted Owl surveys for the British Columbia Ministry of Environment, Lands and Parks recorded all owls during their surveys in southwestern BC. As there is information spanning about ten years it may be possible to get some idea of Western Screech-owl population trends if there are sufficient records of this species.

In the US generally (White 1994) and in Idaho in particular (Belthoff, pers. comm., 2001, Doremus, pers. comm., 2001 and Hayward, pers. comm., 2001) the populations of Western Screech-owls have been described as stable or probably stable.

Coastal Subspecies – *Otus kennicottii kennicottii*

Campbell *et al.* (1990) gathered a total of 1,377 historical and recent records of both subspecies of Western Screech-owl in the BC bird atlas. They consider *O k. kennicottii* to be uncommon to fairly common on the south coast and Vancouver Island and rare to uncommon on the northern mainland. Numerous anecdotal reports and a few reports described below help to elucidate the abundance of this subspecies.

Three recent studies conducted on Vancouver Island show that the species is still relatively common in suitable habitat over unsettled regions of the island (Setterington 1998, Holroyd et al. 2000, Mico and Van Enter 2000). Owls surveys in the Nimpkish Valley which were estimated to cover about 14% of the watershed (about 26,000 ha, but all at lower elevations) found between 61 and 102 individual Western Screech-owls annually between 1995 and 1997 (Setterington 1998). Western Screech-owls were the most common owl species of the five recorded. In Clayoquot Sound, Western Screech-owls were again the most common of five owl species found in breeding season surveys conducted there (Holroyd et al. 2000). In the Campbell River watershed study, screech-owls were the second-commonest species of four, after Northern Saw-whet Owl (*Aegolius acadicus*) (Mico and Van Enter 2000). At 16 of 60 stations, and at all of their five study sites, the authors recorded Western Screech-owls. A study of unknown scope and date in Pacific Rim National Park that recorded screech-owls on a monthly basis, tallied up to eight screech-owls in January (Holmes, pers. comm., 2001).

In contrast to its status in western and northern Vancouver Island, the abundance of the species in southeastern Vancouver Island from Victoria to Nanaimo and in the Lower Mainland seems to have declined in the last 20 years. Here, researchers and birders almost all state that within the last decade or two the species had changed from common or reasonably common to very uncommon or locally extirpated. This is the case on the University of Victoria campus, where in 1979 there were 13 pairs on the campus and there are now none (Levesque 2000, Fraser pers. comm., 2001). At six other locations in the Victoria area where the species was present in the early 1980s it is no longer present (Fraser pers. comm., 2001). As well, Hobbs (pers. comm. 2001), although still finding Western Screech-owls in southern Vancouver Island (he was

aware of at least 18 locations) believes that they are declining rapidly and is aware of locations where the species once was, but is no longer present. Fraser (pers. comm., 2001) also states that south of Nanaimo at a location where he conducted owls surveys between 1987 to 1998, Western Screech-owls changed from being the most commonly detected owl to rarely encountered. A similar decline appears to have occurred on Newcastle Island (near Nanaimo) where the species has not been seen in five years, and in the Gulf Islands (Fraser, pers. comm., 2001). In the Duncan area, Aldcroft (pers. comm., 2001) also thinks that Western Screech-owls have decreased in the area he is familiar with – in 1984 he felt they were common, but he has not heard one in the last three years despite continuing to look for them.

Darling (pers. comm., 2001) has also studied owls in southeastern Vancouver Island. She has collected 623 historic records of screech-owls over the coastal Douglas-fir zone that runs in a narrow band along the east coast of the island from about Denman Island to the southern tip. This includes records of several owls at one location, as well as records of the same owl at different dates. She also surveyed owls in 1998 and gathered 43 records, although some of these are repeat locations at different dates. She was not able to analyze this data in detail, but did find that in many areas, particularly in urban and suburban landscapes where Western Screech-owls had previously been reported, there were often no longer screech-owls present (Darling pers. comm., 2001).

In the Lower Mainland, similar observations of declining Western Screech-owls numbers have been made. Toochin (pers. comm., 2001) believes that there are only 10 known pairs in Greater Vancouver, and that the decline in numbers began in the late 1980s. Also, as mentioned earlier, the species is no longer present in Campbell Valley Regional Park where they once were (Mackenzie, pers. comm. 2001). Mackenzie believes that they are very rare or perhaps extirpated in the White Rock CBC area. In Burnaby, Clulow (pers. comm. 2001) states that Western Screech-owls have declined almost to the point of disappearance. Three former screech-owl territories in a Burnaby park that he was familiar with have not been occupied for three years and the species is no longer present in other local areas. Also, Western Screech-owls known to be regularly present on the University of British Columbia Endowment Lands in Vancouver, have not been detected for a few years (Cannings, pers. comm., 2001). Finally, on the White Rock CBC, where owling efforts have been relatively constant since 1982, screech-owls have not been recorded since 1996 (Mackenzie pers. comm., 2001). Between 1982 and 1996, the longest gap of time without screech owls was two years. Somewhat contrary to these accounts are the results of Robertson *et al.* (2000), who surveyed for Western Screech-owls in 26 areas in the Lower Mainland and the coast to the north of that area. The researchers recorded Western Screech-owls in 42% of their surveys, despite the survey sites not being chosen on the basis of being whether they were good screech-owl habitat.

Thus, *O. k. kennicottii* could be described as relatively common and perhaps stable through much of the coast, especially Vancouver Island away from the south-eastern coast. On the other hand, along the south-easternmost coast of Vancouver Island and in the southwestern portion of the mainland the populations appear to be low and likely

decreasing. The status of the species along the long stretch of the upper mainland coast up to the Alaska border is poorly known, although in north-coastal BC around the Kitimat valley, the species is apparently very rare (Horwood pers. comm. 2001).

The total number of *O. k. kennicottii* in BC could be estimated to be between 3,000 and 10,000 individuals. The upper estimate is based on the fact that there is a large amount of available habitat on Vancouver Island and on the northern mainland coast, and additionally the species seems to be common through much of this area. In the Nimpkish Valley study, Setterington (1998) estimated that the owl surveyors covered only about 14% of the Nimpkish Valley and in that area recorded about 100 owls (though the low-elevation survey routes may have covered most of the good screech-owl habitat in the valley—Matkoski, pers. comm.). Also, even if they are uncommon, as suggested by Campbell *et al.* (1990), through most of the mainland coast then this could account for several thousand owls, given the large extent of available habitat. Additionally, abundance estimates within study areas are likely underestimated as Western Screech-owls do not always respond to tapes or are not always calling spontaneously. For instance, in the Nimpkish Valley surveyors found owls at 18% of sites in 1995 when sites were visited twice, while in 1996 30% of sites had owls when five visits were made. Mico and Van Enter (2000) recorded 16 screech-owls in their one-season study, and visited each site three times but never got a response from screech-owls on more than one occasion. Finally, Cannings (1997) had to return four times to a known site with screech-owls before he got a response.

On the other hand, the lower estimate of 3,000 individuals takes into account the fact that the population is declining in the south and may be declining to a lesser but unknown degree further north. Certainly the large areas of dense, even-aged young forests produced by clear-cut forestry over the past few decades has lowered habitat quality for this species along the BC coast.

Interior Subspecies – *Otus kennicottii macfarlanei*

Campbell *et al.* (1990) describes *O. k. macfarlanei* as rare to uncommon and local in the central-southern interior and very rare in the west and east Kootenays. Cannings *et al*. (1987) gave a similar description of the interior BC numbers; they agree with Munro and Cowan (1949) who in the 1940s said that the species was ‘formerly more common in the south than in the north (Okanagan), now scarce everywhere’.

The only comprehensive survey of *O. k. macfarlanei* in Canada is by Cannings (1997). Throughout appropriate habitat in the interior, he surveyed 250 sites (most only once) in the spring or summer of 1996 and found only 13 sites with Western Screech-owls. Twelve of these were in the Okanagan Valley: eight south of Penticton, and four between Penticton and Kelowna. A thirteenth site was found along the Granby River north of Grand Forks, just outside the Okanagan Valley. He concluded that interior Western Screech-owls seemed to be primarily restricted to the Okanagan Valley, but he felt that there was still the possibility that small numbers of birds may be present in the Nicola, Thompson and Kootenay regions. Since this 1996 study, a few new screech-

owl sites have been found in the Okanagan Valley—there are now eight known locations near Kelowna (Charlesworth, pers. comm., 2001, Hobbs, pers. comm., 2001). These may not all be breeding sites. Other recent screech-owl records from the region include 13 road-killed screech-owls that were turned into the South Okanagan Rehabilitation Centre for Owls between 1980 and 2000 (Hobbs, pers. comm. 2001).

Outside of the Okanagan region, *O. k. macfarlanei* continues to be considered rare to very rare and breeding has never been documented (Beaucher, pers. comm., 2001, Clow, pers. comm., 2001, Howie pers. comm., 2001, Wege pers. comm. 2001) (Table 1). Many of the birds outside of the Okanagan region are thought to be non-breeding, dispersing birds as some of the records are from outside the breeding season (R. Cannings pers. comm. 2001). If this is the case, it seems likely that some owls may be coming from Idaho and Washington, which are closer to the record locations than the Okanagan Valley. West and north of the Okanagan (in an area roughly bounded by Spences Bridge, Merritt, Shuswap Lake and Clearwater) Howie (pers. comm., 2001) is not aware of any confirmed sightings since 1988, although there are four specimens from the 1980s in the southern half of this area. There have also been unconfirmed reports of the species from the Little Fort and Celista areas in the last five years. Although Howie (pers. comm., 2001) feels that the species is very rare and was probably never very common, anecdotal reports suggest that the species may have declined in the last three to four decades. On the other hand, he does note that there are numerous remote unsurveyed drainages where the species may occur.

Table 1. Recent (post-1980) observations of Western Screech-owl O. k. macfarlanei in Canada east of the Okanagan Valley. Locations are noted from west to east and are of the town or other location nearest to the sighting. Each record is of a single bird unless noted. If undated, sources are pers. comm. 2001.

Location	Date	Comments	Source
Granby River, north of Grand Forks, BC	Spring, Summer 1996	heard both seasons	Cannings 1997
Robson, BC	Jan 23, 2001	seen	E. Beynon
Castlegar, BC	April-May yearly, except not 2001	three to four locations, mainly heard	S. Clow
Wynndel, BC	February 22, 1998	seen and heard, present two weeks	M-A. Beaucher
Creston Valley Wildlife Management Area, BC	December 24, 2000	seen	M-A. Beaucher
Waterton Lakes National Park, Alberta	June, 2001	heard, unconfirmed	C. Smith
Cypress Hills, Saskatchewan	Spring 1992	heard	Smith 1996
Cypress Hills, Saskatchewan	Spring 1994	heard	Smith 1996

Thus, *O. k. macfarlanei* populations can be considered very small and concentrated in the Okanagan Valley and can continue to be described as rare or very rare. Also, the range of the subspecies may be contracting. Numbers of *O. k. macfarlanei* are difficult to estimate, but must be at a minimum about 50 individuals and probably more likely in the low hundreds, as it seems probable that not all locations are known.

LIMITING FACTORS AND THREATS

Factors that regulate populations have been little studied (Cannings and Angell 2001), but some factors that are important can be presumed. For instance, the availability of suitable nest cavities must affect the ability of the Western Screech-owl to successfully breed, although if nest boxes are provided they will readily use them (Deal, pers. comm., 2001, Doremus, pers. comm., 2001). It has been suggested that forestry operations negatively affect screech-owl habitat both by the removal of habitat through timber harvesting and through the removal of dead trees and snags which serve as potential nest cavity trees (Darling, pers. comm., 2001, Fraser, pers. comm., 2001). Yet, the relationship between Western Screech-owls and forestry operations has not been studied. Forest fires, perhaps like logging, may also temporarily remove habitat for interior populations (Hayward, pers. comm., 2001).

Habitat loss, both on the south coast and in the interior of BC is a threat, as mentioned in the Habitat Trends section. This is of particular concern for *O. k. macfarlanei* which occurs over a much smaller portion of the country than the coastal population, and primarily in declining riparian habitats that are favoured for development, agriculture and forestry. MWLAP (2001) estimates that there is about 15,600 ha of appropriate habitat for the species in the southern Okanagan. R. Cannings (pers. comm., 2001) feels that an estimate about twice this size would include all of the appropriate habitat for *O. k. macfarlanei* in Canada.

Almost all anecdotal reports from the Lower Mainland and from southeastern Vancouver Island, as well as two from Washington state, cite Barred Owl predation as a probable cause of Western Screech-owl declines, or at least they state that when Barred Owl numbers increase Western Screech-owl numbers decline (Acker, pers. comm., 2001, Aldcroft, pers. comm., 2001, Clulow, pers. comm., 2001, Fraser, pers. comm., 2001, Hobbs, pers. comm., 2001, Ryder via Mackenzie, pers. comm., 2001, Toochin, pers. comm., 2001). As noted, the Barred Owl has only in the last few decades become common in BC, as the species spread southwestward into areas that it had not previously occupied. Fraser (pers. comm., 2001) hypothesizes that Barred Owls and Great-horned Owls are doing particularly well in south-eastern Vancouver Island because of the introduction and establishment of eastern mammal species that they might be using as a food source. Both the Grey Squirrel (*Sciurus carolinensis*) and the Eastern Cottontail (*Sylvilagus floridanus*), have in recent decades become well established in large parts of southeastern Vancouver Island and the Lower Mainland, but do not occur anywhere else in the province in significant numbers (Nagorsen *in prep*).

It is completely unknown if Barred Owls are negatively affecting Western Screech-owl populations outside the south coast of BC—certainly Barred Owls are present, and are reasonably common in these parts of the screech-owls' range. For instance, in the Nimpkish Valley survey, between 19 and 27 Barred Owls were recorded in a season's surveys (Setterington 1998) and in the Campbell River Watershed, 16% of all owl detections were Barred Owl detections (in contrast to 28% that were Western Screech-owl) (Mico and Van Enter 2000).

SPECIAL SIGNIFICANCE OF THE SPECIES

The Western Screech-owl has been considered an indicator species for healthy riparian ecosystems throughout most of its range. Its dependence on older trees for roosting and nesting cavities and position near the top of the food chain make it an ideal choice for an umbrella species in multispecies conservation plans.

EXISTING PROTECTION AND OTHER STATUS DESIGNATIONS

As a non-migratory species the Western Screech-owl is not included in the Migratory Birds Convention Act. At the provincial level, along with most other birds, the Western Screech-owl is protected under the British Columbia Wildlife Act. This means that it is an offence to take, harm or destroy the birds, and their nests and eggs. People working in the woods for the logging industry have special exemption. The Western Screech-owl is naturally somewhat protected from direct persecution, due to its small size and its nocturnal nature.

The Western Screech-owl is not listed nor proposed under the US Endangered Species Act, nor is it listed in the IUCN Red Book, although all owls (Strigiformes) are listed as a group under Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Appendix II species are not necessarily threatened with extinction, but may become so without careful control of trade.

The ranks below have been assigned to the species or subspecies using the Biological and Conservation Data System developed by The Nature Conservancy (BCCDC 2001, Nature Serve 2001), where:

1. Critically imperiled because of extreme rarity (5 or fewer extant occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extirpation or extinction
2. Imperiled because of rarity (typically 6-20 extant occurrences or few remaining individuals) or because of some factor(s) making it vulnerable to extirpation or extinction
3. Rare or uncommon (typically 21-100 occurrences); may be susceptible to large-scale disturbances; e.g. may have lost extensive peripheral populations
4. Frequent to common (greater than 100 occurrences); apparently secure but may have a restricted distribution; or there may be perceived future threats
5. Common to very common; demonstrably secure and essentially ineradicable under present conditions

International: G5
National (Canada): N4
National (US): N5
Provincial and State (from north to south): Alaska S3?B, British Columbia S4, Saskatchewan S1B, S1N, Washington S5, Idaho S4, Montana S3S4, Oregon S4?, Wyoming S2, California S?, Nevada S4, Utah S3S4, Colorado S4B, Kansas S1, Arizona S5, New Mexico S4B S4N, Texas S4.

Note that the states and provinces with a species rank of S2 and S1 are all jurisdictions where the species is peripheral.

Otus kennicottii macfarlanei: T4 for the whole subspecies; within BC S1 (therefore Red-listed).

Otus kennicottii kennicottii: no listing (T?) for the whole subspecies; BC S4

The species is not listed under the British Columbia Wildlife Act as endangered or threatened, although Red Listed species or subspecies are taxa that could be considered for more formal listing under this act. If the species were specifically listed as endangered or threatened under the act, it would not receive further protection (though both fines and awareness are increased). It is not listed as a species at risk (endangered, threatened, vulnerable or similar terms) in any of the northern US states (Alaska, Washington, Idaho, Oregon, Montana and Wyoming).

For a brief discussion of how much of this species range is protected within parks see the Habitat, Protection/ownership section.

SUMMARY OF STATUS REPORT

In this report the Western Screech-owl is divided into two populations, *Otus kennicottii kennicottii* and *Otus kennicottii macfarlanei*, each a separate subspecies with a range that does not overlap in Canada. *O. k. kennicottii* is found over a large portion of coastal BC and has a population that numbers in the thousands. Abundance is poorly known for the north coastal portions of this subspecies, although it seems to be relatively common at lower elevations on much of Vancouver Island. Population trends are unknown in these areas. In south-eastern Vancouver Island and the Lower Mainland area, populations appear to be declining rapidly based primarily on strong anecdotal evidence. The apparent decline is thought to be due to the recent establishment in southern BC of the Barred Owl, a species which preys on Western Screech-owls. Urban development and forestry practices may also have affected the amount of available habitat. If population declines are mainly due to Barred Owl populations, then a reversal of these declines will be difficult to implement.

O. k. macfarlanei is found in the interior of BC, primarily in the Okanagan Valley. Although the subspecies has probably always been uncommon or rare in BC, numbers are currently known to be very small based on a recent survey. The population is thought to number in the low hundreds, or in a worse-case scenario, may total less than a hundred individuals. It is thought that its population is declining at an unknown rate due to habitat loss. Riparian and other low-lying habitat favoured by Western Screech-owls is being developed fairly rapidly for housing and agricultural uses in the Okanagan region. It may be possible to slow declines in the population if some appropriate habitat is protected from development.

TECHNICAL SUMMARY

Otus kennicottii kennicottii
Western Screech-owl, *kennicottii* subspecies Petit-duc des montagnes – *kennicottii*
Range of occurrence in Canada (by province / territory / ocean) BC

Extent and Area information	
• *extent of occurrence(km²)*	ca 200,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	probably stable
• *are there extreme fluctuations in extent of occurrence (> 1 order of magnitude)?*	no
• *area of occupancy (km²)*	ca. 50,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	decline
• *are there extreme fluctuations in area of occupancy (> 1 order magnitude)?*	No
• *number of extant locations*	n.a.
• *specify trend in # locations (decline, stable, increasing, unknown)*	n.a.
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	n.a.
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	declining
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	2-3 yrs
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	3,000-10,000
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	slow decline
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	unknown
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	No
• *list each population and the number of mature individuals in each*	-
• *specify trend in number of populations (decline, stable, increasing, unknown)*	-
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	-
Threats (actual or imminent threats to populations or habitats	
- Barred Owl depredation - Loss of habitat due to development/agriculture - Possible loss of nest cavity trees associated with forestry	

Rescue Effect (immigration from an outside source)	Moderate
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	declining
• *is immigration known or possible?*	Yes, but limited due to non-migratory nature of species
• *would immigrants be adapted to survive here?*	limited perhaps by presence of Barred Owls
• *is there sufficient habitat for immigrants here?*	limited by habitat loss
Quantitative Analysis	

TECHNICAL SUMMARY

Otus kennicottii macfarlanei
Western Screech-owl, *macfarlanei* subspecies Petit-duc des montagnes - *macfarlanei*
Range of Occurrence in Canada (by province / territory / ocean) BC

Extent and Area information	
• *extent of occurrence(km²)*	ca. 22,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	stable
• *are there extreme fluctuations in extent of occurrence (> 1 order of magnitude)?*	No
• *area of occupancy (km²)*	ca. 100 km^2
• *specify trend (decline, stable, increasing, unknown)*	declining
• *are there extreme fluctuations in area of occupancy (> 1 order magnitude)?*	no
• *number of extant locations*	unknown (minimum ~25)
• *specify trend in # locations (decline, stable, increasing, unknown)*	possible decline
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	no
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	declining
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	2-3 yrs
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	50-200
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	declining
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	unknown
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	No
• *list each population and the number of mature individuals in each*	-
• *specify trend in number of populations (decline, stable, increasing, unknown)*	-
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	-
Threats (actual or imminent threats to populations or habitats)	
- Loss of habitat due to development/agriculture - Possible loss of nest cavity trees associated with forestry	

Rescue Effect (immigration from an outside source)	Moderate
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	probably stable or slowly decreasing
• *is immigration known or possible?*	Yes, but limited due to non-migratory nature of species
• *would immigrants be adapted to survive here?*	Yes
• *is there sufficient habitat for immigrants here?*	No; main threat is habitat loss
Quantitative Analysis	

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Rosalind Chaundy-Smart has a B.Sc. in zoology from the University of British Columbia, and an M.Sc.F. from the University of Toronto. During her graduate studies, she examined the effects of clear-cutting and wildfire on insects and plants of mixed coniferous and deciduous forests.

She has been a keen field ornithologist for 20 years, conducting bird surveys and assessments for conservation organizations and governments, and birding across the breadth of the continent for personal pleasure. She has worked on diverse ornithological projects including: raptor use of the Redhill Valley, Hamilton; seabird surveys along the coast of BC; interior BC forest songbird studies; and the Woodlands Biodiversity project, which was a forest fragmentation study. Ms. Chaundy-Smart also spent two years at the Owl Foundation in southern Ontario observing owl behaviour. She recently worked for Bird Studies Canada as the technical coordinator of the Canadian Important Bird Areas program and currently works for an environmental consulting company, Gartner Lee Limited, in Markham, Ontario.

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